

## Conference Abstract

# Image Recognition to Enhance the Value of Collections

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## Abstract

Techniques for image recognition through *machine learning* have advanced rapidly over recent years and applications using this technique are becoming increasingly common.. Applications using image recognition have enormous potential not only for research, education, conservation and capacity-building but certainly also for collections management. Perhaps by now an even bigger challenge than the technological one is supplying content in the form of large amounts of validated images. With an estimated 44 million objects, the collection of Naturalis Biodiversity Center has plenty of physical source material.

During a five-year digitization programme (2010–2015) at Naturalis, 4.4 million herbarium sheets were imaged and since the start of the “Butterflies in Bags” project, 50,000 papered butterflies (out of more than 500,000) have been digitized and photographed by volunteers in a standardized manner. Still there are large parts of our collection that are not digitized at specimen level, let alone imaged, but hold great potential for collections work. This poster presents a workflow for efficient scanning of insect drawers and automated segmentation of those images to “feed” deep learning-based image recognition with images of individual insects. It will also demonstrate how this will aid in enhancing the value of our collections.

With proper expert validation early on in the process, the software could mature and become more independent in such a way that ultimately, it could be used by non-specialist professionals to identify the majority of common species. The technique would pinpoint

anomalies based on self-learned patterns, both in unidentified and in already identified specimens, and link those back to the taxonomic specialist. Not only does image recognition aid taxonomy, it may also hold potential for conservation and management by, for example, detecting damaged specimens or managing space utilization of drawers.

## **Keywords**

digitization workflow, image recognition, deep learning, insect drawers, taxonomy

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